

WHAT IS CLAIMED:

1. A rolled tissue product comprising:
a single-ply tissue web spirally wound into a roll, the wound roll having a Kershaw roll firmness of less than about 7.8 mm and a roll bulk of greater than about 10 cc/g, the tissue web having a basis weight of greater than about 25 gsm bone dry, the tissue web further having a fuzz-on-edge of greater than about 1.7 mm/mm on at least one side of the web and a geometric mean tensile strength of greater than about 550 g/3 inches.
2. A tissue product as defined in claim 1, wherein the base web comprises an uncreped through-air dried web.
3. A tissue product as defined in claim 1, wherein the roll bulk is about 10.5 cc/g or greater.
4. A tissue product as defined in claim 1, wherein the roll bulk is about 11 cc/g or greater.
5. A tissue product as defined in claim 1, wherein the roll bulk is about 11.5 cc/g or greater.
6. A tissue product as defined in claim 1, wherein the roll bulk is about 12 cc/g or greater.
7. A tissue product as defined in claim 1, wherein the roll bulk is about 13 cc/g or greater.
8. A tissue product as defined in claim 1, wherein the roll bulk is about 14 cc/g or greater.
9. A tissue product as defined in claim 1, wherein the Kershaw firmness is less than about 7.6 mm.
10. A tissue product as defined in claim 1, wherein the Kershaw firmness is less than about 7.3 mm.
11. A tissue product as defined in claim 1, wherein the Kershaw firmness is from about 7.0 to about 7.8 mm.
12. A tissue product as defined in claim 1, wherein the Kershaw firmness is from about 7.2 to about 7.5 mm.
13. A tissue product as defined in claim 1, wherein the basis weight of the tissue web is from about 25 gsm to about 40 gsm bone dry.

14. A tissue product as defined in claim 1, wherein the basis weight of the tissue web is from about 30 gsm to about 38 gsm bone dry.

15. A tissue product as defined in claim 1, wherein the basis weight of the tissue web is about 32 gsm bone dry or greater.

16. A tissue product as defined in claim 1, wherein the basis weight of the tissue web is about 34 gsm bone dry or greater.

17. A tissue product as defined in claim 1, wherein the geometric mean tensile strength of the tissue web is about 550 g/3 inches or greater.

18. A tissue product as defined in claim 1, wherein the geometric mean tensile strength of the tissue web is about 600 g/3 inches or greater.

19. A tissue product as defined in claim 1, wherein the geometric mean tensile strength of the tissue web is about 650 g/3 inches or greater.

20. A tissue product as defined in claim 1, wherein the fuzz-on-edge of at least one side of the tissue web is about 2.0 mm/mm or greater.

21. A tissue product as defined in claim 1, wherein the fuzz-on-edge of at least one side of the tissue web is about 2.5 mm/mm or greater.

22. A tissue product as defined in claim 1, wherein the fuzz-on-edge of at least one side of the tissue web is about 3.0 mm/mm or greater.

23. A tissue product as defined in claim 1, wherein the fuzz-on-edge of at least one side of the tissue web is about 3.5 mm/mm or greater.

24. A tissue product as defined in claim 1, wherein the machine direction coefficient of friction of the higher fuzz-on-edge side of the tissue web is greater than about 0.32.

25. A tissue product as defined in claim 1, wherein the cross-machine direction coefficient of friction of higher fuzz-on-edge side of the tissue web is greater than about 0.32.

26. A tissue product as defined in claim 1, wherein the tissue web has a bending stiffness/GM slope A that is less than about 0.006.

27. A tissue product as defined in claim 1, wherein the tissue web has a compression linearity of less than about 0.50.

28. A tissue product as defined in claim 1, wherein the tissue web is substantially free of pinholes.

29. A rolled tissue product comprising:

a multi-ply tissue containing at least two plies spirally wound into a roll, the wound roll having a Kershaw roll firmness of less than about 9.0 mm and a roll bulk of greater than about 9 cc/g, the tissue having a basis weight of greater than about 35 gsm bone dry, the tissue further having a fuzz-on-edge of greater than about 2.0 mm/mm on at least one exterior side of the tissue, the tissue further having a geometric mean tensile strength of greater than about 500 g/3 inches.

30. A tissue product as defined in claim 29, wherein the tissue consists of two plies.

31. A tissue product as defined in claim 29, wherein the tissue consists of three plies.

32. A tissue product as defined in claim 29, wherein the wound roll has a Kershaw roll firmness of less than about 8.5 mm.

33. A tissue product as defined in claim 29, wherein the wound roll has a Kershaw roll firmness of less than about 8.0 mm.

34. A tissue product as defined in claim 29, wherein the wound roll has a Kershaw roll firmness of less than about 7.5 mm.

35. A tissue product as defined in claim 29, wherein the wound roll has a Kershaw roll firmness of less than about 7.0 mm.

36. A tissue product as defined in claim 29, wherein the wound roll has a roll bulk of greater than about 9.5 cc/g.

37. A tissue product as defined in claim 29, wherein the wound roll has a roll bulk of greater than about 10.0 cc/g.

38. A tissue product as defined in claim 29, wherein the wound roll has a roll bulk of greater than about 10.5 cc/g.

39. A tissue product as defined in claim 29, wherein the wound roll has a roll bulk of greater than about 11.0 cc/g.

40. A tissue product as defined in claim 29, wherein the wound roll has a roll bulk of greater than about 12.0 cc/g.

41. A tissue product as defined in claim 29, wherein the wound roll has a roll bulk of greater than about 13.0 cc/g.

42. A tissue product as defined in claim 29, wherein the tissue has a basis weight of from about 35 gsm to about 80 gsm bone dry.

43. A tissue product as defined in claim 29, wherein the tissue has a basis weight of from about 40 gsm to about 60 gsm bone dry.

44. A tissue product as defined in claim 29, wherein the tissue has a basis weight of greater than about 45 gsm bone dry.

45. A tissue product as defined in claim 29, wherein the tissue has a basis weight of greater than about 50 gsm bone dry.

46. A tissue product as defined in claim 29, wherein the exterior side of the tissue has a fuzz-on-edge of greater than about 2.2 mm/mm.

47. A tissue product as defined in claim 29, wherein the exterior side of the tissue has a fuzz-on-edge of greater than about 2.4 mm/mm.

48. A tissue product as defined in claim 29, wherein the exterior side of the tissue has a fuzz-on-edge of greater than about 2.6 mm/mm.

49. A tissue product as defined in claim 29, wherein the tissue has a first exterior side and a second exterior side, each of the exterior sides having a fuzz-on-edge of greater than about 2.0 mm/mm.

50. A tissue product as defined in claim 29, wherein the tissue has a first exterior side and a second exterior side, each of the exterior sides having a fuzz-on-edge of greater than about 2.1 mm/mm.

51. A tissue product as defined in claim 29, wherein the tissue has a first exterior side and a second exterior side, each of the exterior sides having a fuzz-on-edge of greater than about 2.2 mm/mm.

52. A tissue product as defined in claim 29, wherein the tissue has a geometric mean tensile strength of greater than about 600 g/3 inches.

53. A tissue product as defined in claim 29, wherein the tissue has a geometric mean tensile strength of greater than about 700 g/3 inches.

54. A tissue product as defined in claim 29, wherein the tissue has a geometric mean tensile strength of greater than about 800 g/3 inches.

55. A tissue product as defined in claim 29, wherein the tissue has a geometric mean tensile strength of greater than about 900 g/3 inches.

56. A tissue product as defined in claim 29, wherein the multi-ply tissue is substantially free of pinholes.

57. A shear-calendering process comprising the steps of:
providing a first tissue web, said tissue web comprising pulp fibers;

conveying the first tissue web through a nip formed between an outer surface of a rotating roll and an opposing moving surface, wherein the outer surface of the roll and the opposing surface are moving at different speeds within the nip, the nip calendering the first tissue web while simultaneously subjecting the web to shearing forces sufficient to increase the fuzz-on-edge properties of one side of the web; and

combining the first tissue web with a second tissue web to form a multi-ply tissue product, the one side of the first tissue web with increased fuzz-on-edge properties forming an exterior side of the tissue product.

58. A process as defined in claim 57, further comprising the step of spirally winding the multi-ply tissue product into a rolled product.

59. A process as defined in claim 57, wherein the opposing surface comprises a rotating roll.

60. A process as defined in claim 57, wherein the opposing surface comprises a moving belt.

61. A process as defined in claim 58, wherein the tissue product has a bone dry basis weight of greater than about 35 gsm, and wherein the rolled product has a roll bulk of greater than about 9 cc/g and the exterior side has a fuzz-on-edge of greater than about 2.0 mm/mm.

62. A process as defined in claim 61, wherein the rolled product has a roll bulk of greater than about 12 cc/g.

63. A process as defined in claim 61, wherein the exterior side of the tissue product has a fuzz-on-edge of greater than about 2.2 mm/mm.

64. A process as defined in claim 61, wherein the exterior side of the tissue product has a fuzz-on-edge of greater than about 2.4 mm/mm.

65. A process as defined in claim 61, wherein the rolled product has a Kershaw firmness of less than about 9.0 mm.

66. A process as defined in claim 61, wherein the rolled product has a Kershaw firmness of less than about 8.0 mm.

67. A process as defined in claim 59, wherein both of the rotating rolls have an exterior surface comprising a polymeric material.

68. A process as defined in claim 57, wherein the outer surface of the roll and the outer opposing surface are moving at speed differentials between 5% and 100%.

69. A process as defined in claim 57, wherein the outer surface of the roll and the outer opposing surface are moving at speed differentials between 7% and 40%.

70. A process as defined in claim 57, wherein the outer surface of the roll and the outer opposing surface are moving at speed differentials between 10% and 25%.

71. A process as defined in claim 57, wherein the second tissue web is also conveyed through a nip formed between an outer surface of a rotating roll and an opposing moving surface, wherein the outer surface of the roll and the opposing surface are moving at different speeds within the nip, the nip calendering the second tissue web while simultaneously subjecting the web to shearing forces sufficient to increase the fuzz-on-edge properties of one side of the second web, the side of the web with increased fuzz-on-edge properties also forming an exterior surface of the tissue product.

72. A process as defined in claim 57, wherein the first tissue web and the second tissue web are attached together using an adhesive.

73. A process as defined in claim 57, wherein the first tissue web and the second tissue web are mechanically attached together.

74. A rolled tissue product comprising:
a multi-ply tissue containing at least two plies spirally wound into a roll, the wound roll having a Kershaw roll firmness of less than about 8.5 mm and a roll bulk of greater than about 12 cc/g, the tissue having a basis weight of greater than about 35 gsm bone dry, the tissue further having a fuzz-on-edge of greater than about 2.0 mm/mm on at least one exterior side of the tissue, the tissue further having a geometric mean tensile strength of greater than about 700 g/3 inches.

75. A tissue product as defined in claim 74, wherein the wound roll has a Kershaw roll firmness of less than about 7.5 mm.

76. A tissue product as defined in claim 74, wherein the wound roll has a roll bulk of greater than about 13.0 cc/g.

77. A tissue product as defined in claim 74, wherein the tissue has a basis weight of from about 35 gsm to about 80 gsm bone dry.

78. A tissue product as defined in claim 74, wherein the tissue has a basis weight of from about 40 gsm to about 60 gsm bone dry.

79. A tissue product as defined in claim 74, wherein the exterior side of the tissue has a fuzz-on-edge of greater than about 2.2 mm/mm.

80. A tissue product as defined in claim 74, wherein the exterior side of the tissue has a fuzz-on-edge of greater than about 2.4 mm/mm.

81. A tissue product as defined in claim 74, wherein the tissue has a first exterior side and a second exterior side, each of the exterior sides having a fuzz-on-edge of greater than about 2.0 mm/mm.

82. A tissue product as defined in claim 74, wherein the tissue has a first exterior side and a second exterior side, each of the exterior sides having a fuzz-on-edge of greater than about 2.2 mm/mm.

83. A tissue product as defined in claim 74, wherein the multi-ply tissue is substantially free of pinholes.